

# इंटरनेट

# मानक

## Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 10460 (1983): Functional requirements for small foam tender for fire brigade use [CED 22: Fire Fighting]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



**IS : 10460 - 1983**

**(Reaffirmed 2000)**

**Edition 1.1**

**(1988-11)**

*Indian Standard*

**FUNCTIONAL REQUIREMENTS FOR  
SMALL FOAM TENDER FOR  
FIRE BRIGADE USE**

(Incorporating Amendment No. 1)

UDC 614.846.63 : 614.842.615

© BIS 2005

**BUREAU OF INDIAN STANDARDS**  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

**Price Group 5**

*Indian Standard*

# FUNCTIONAL REQUIREMENTS FOR SMALL FOAM TENDER FOR FIRE BRIGADE USE

---

## Fire Fighting Sectional Committee, BDC 22

*Chairman**Representing*

SHRI G. B. MENON

Ministry of Home Affairs

*Members*

SHRI MAHESH C. AGARWAL

Brijbasi Udyog, Mathura

SHRI P. S. BANERJEE ( *Alternate* )

SHRI S. R. BANSAL

Steel Authority of India (Bokaro Steel Plant), Bokaro

SHRI A. CHATTERJEE

Tariff Advisory Committee, Bombay

SHRI F. B. SANJANA ( *Alternate* )DEPUTY INSPECTOR GENERAL  
(RPSE)

Ministry of Railways

ASSISTANT SECURITY OFFICER  
(F I R E) (NORTHERN  
RAILWAY) ( *Alternate* )

SHRI V. P. DEWAN

Ministry of Defence (DGI)

LT-COL V. R. BANAHATI ( *Alternate* )

SHRI R. R. DHOBLEY

Bhabha Atomic Research Centre, Bombay

DIRECTOR

Home Department (Fire Service), Government of  
Tamil Nadu, MadrasDEPUTY DIRECTOR ( *Alternate* )

DIRECTOR (FIRE SERVICES)

Home (Police) Department, Government of Andhra  
Pradesh, HyderabadDEPUTY DIRECTOR (FIRE  
SERVICES) ( *Alternate* )

SHRI G. N. GIDWANI

Directorate General of Supplies and Disposals, New  
DelhiSHRI D. N. PANDIT ( *Alternate* )

SHRI A. K. GUPTA

Central Building Research Institute (CSIR), Roorkee

SHRI K. K. DAS GUPTA

West Bengal Fire Services, Calcutta

SHRI J. S. JAMSHEDJI

Steelage Industries Limited (Minimax Division),  
BombaySHRI C. GHANARAJ ( *Alternate* )( *Continued on page 2* )

© BIS 2005

**BUREAU OF INDIAN STANDARDS**

This publication is protected under the *Indian Copyright Act* (XIV of 1957) and reproduction in whole or in part by any means except with written permission of the publisher shall be deemed to be an infringement of copyright under the said Act.

## IS : 10460 - 1983

( Continued from page 1 )

<i>Members</i>	<i>Representing</i>
SHRI S. N. KUNDU	Fire and Safety Appliances Co, Calcutta
MANAGING DIRECTOR	Avon Services (P & A) Private Ltd, Bombay
TECHNICAL EXECUTIVE ( <i>Alternate</i> )	
SHRI B. R. MEHTA	The Institution of Fire Engineers (India), New Delhi
SHRI A. N. AHLUWALIA ( <i>Alternate</i> )	
COL S. A. MOHILE	Ministry of Defence (R & D)
SHRI A. K. SURI ( <i>Alternate</i> )	
SHRI M. MUKHERJI	Steel Authority of India (Rourkela Steel Plant), Rourkela
SHRI C. D. SHARMA ( <i>Alternate</i> )	
SHRI V. B. NIKAM	Municipal Corporation of Greater Bombay (Bombay Fire Brigade), Bombay
SHRI P. N. PANCHAL	Central Industrial Security Force (Ministry of Home Affairs), New Delhi
SHRI P. L. SEBASTIN	Oil & Natural Gas Commission, Dehra Dun
SHRI V. V. KIMMATKAR ( <i>Alternate</i> )	
SHRI P. H. SETHNA	Kooverji Devshi and Co Pvt Ltd, Bombay
SHRI N. T. PANJWANI ( <i>Alternate</i> )	
SHRI D. K. SIRKAR	Synthetics and Chemicals Ltd, Bareilly
SHRI CHANDRAKANT M. SHAH	Zenith Fire Services, Bombay
SHRI M. H. SHAH ( <i>Alternate</i> )	
SHRI J. V. SHAH	Newage Industries, Surendranagar
SHRI B. J. SHAH ( <i>Alternate</i> )	
SHRI S. S. L. SHARMA	Municipal Corporation of Delhi (Delhi Fire Services), Delhi
SHRI R. K. BHARDWAJ ( <i>Alternate</i> )	
SHRI TARIT SUR	Sur Enamel & Stamping Works Pvt Ltd, Calcutta
SHRI S. SUR ( <i>Alternate</i> )	
SHRI SUSHIL KUMAR	Directorate General of Technical Development, New Delhi
SHRI S. VENKASWAMY	Directorate General of Civil Aviation New Delhi
SHRI B. V. WAGLE	Urban Development and Public Health Department, Bombay
SHRI V. H. MADKAIKAR ( <i>Alternate</i> )	
SHRI G. RAMAN, Director (Civ Engg)	Director General, ISI ( <i>Ex-officio Member</i> )

### *Secretary*

SHRI K. M. MATHUR  
Deputy Director (Civ Engg), ISI

## Fire Fighting Units Subcommittee, BDC 22 : 3

### *Convener*

SHRI P. N. GHOSH                      The Institution of Fire Engineers (India), New Delhi

### *Members*

SHRI A. CHATTOPADHYAY ( *Alternate* to  
Shri P. N. Ghosh )  
SHRI V. P. DEWAN                      Ministry of Defence (DGI)  
LT-COL V. R. BANAHATI ( *Alternate* )

( Continued on page 19 )

## *Indian Standard*

# FUNCTIONAL REQUIREMENTS FOR SMALL FOAM TENDER FOR FIRE BRIGADE USE

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 28 February 1983, after the draft finalized by the Fire Fighting Sectional Committee had been approved by the Civil Engineering Division Council.

**0.2** A number of Indian Standards on fire fighting appliances of different capacities using various media for use in towns and rural areas are available. There are also standards covering large capacity fire fighting appliances for aircraft-crash fire fighting, built on special chassis which are being imported as the type of chassis required is not available in this country. This standard is intended to cover the use of indigenously produced chassis.

**0.3** The appliance conforming to this standard is intended primarily for use in petro-chemical complexes, oil refineries or storages and heavy industries where large quantities of oils or petroleum products are being used as fuel for lubrication purposes.

**0.4** The provision of monitor on the top of appliance has been made to make the appliance more versatile and reliable in attacking fires safely from a distance. Hand lines have their own advantages in industrial complexes to deal with spillage and running fires and also at places which cannot be attacked by the monitor.

**0.5** Though the appliance is basically for fighting fires with foam, yet keeping in view the effectiveness of dry powder on fires involving electrical and other connected equipments used in handling and processing flammable oils, the provision of dry powder system has been made in the standard as supplementary fire extinguishing medium.

**0.6** A list of accessories and equipment which do not form part of this appliance and most of which are normally required to assist in operation of the appliance is given in Appendix B for information and guidance. The appliance shall also conform to statutory rules in regard to height clearance framed by Transport Authority.

**0.7** This edition 1.1 incorporates Amendment No. 1 (November 1988).

## IS : 10460 - 1983

Side bar indicates modification of the text as the result of incorporation of the amendment.

**0.8** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960\*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

### 1. SCOPE

**1.1** This standard lays down the requirements regarding material, design and construction, workmanship and finish, accessories and equipment of small foam tender for fire brigade use.

### 2. GENERAL REQUIREMENTS

**2.1** The appliance shall incorporate a fire pump of 1 800 l/min capacity, a water tank of 1 800 l or 2 000 l capacity, a foam tank of 500 l capacity and connected equipment for foam production and also supplementary extinguishing agent ( see Appendices A and B ).

**2.2** The foam tender shall be fabricated in a manner so as to conform to the following characteristics:

- a) Gross vehicle weight not less than 11 000 kg including crew, water and equipment.
- b) Maximum speed on level road, fully laden, 72 km/h.
- c) Acceleration from a standing start through the gears, fully laden, 64 km/h in 55 seconds.
- d) The appliance shall be capable of being started from rest on a gradient of 1 in 4.
- e) When travelling at 48 km/h on a level dry surface the foot brake shall be capable of stopping the vehicle within a distance of 15 m from the point at which the brake is applied. The hand brake shall be capable of holding the fully laden appliance on a dry surface gradient of 1 in 4 when in neutral gear.
- f) The appliance shall have the following overall dimensions:

Wheel base	Not more than 4 500 mm
Turning circle	Not more than 20 m
Road clearance	Not less than 260 mm
Overall width	Not more than 2.50 m

---

\*Rules for rounding off numerical values ( *revised* ).



**2.3** The appliance shall be capable of delivering not less than 1 800 l/min of water foam solution converted into foam through a combination of monitor and side lines and not less than 900 l/min of water foam solution converted into foam through the side lines alone when the monitor is not in use or not less than 900 l/min of water converted into foam through the monitor alone.

**2.3.1** The monitor and the hand lines should employ the self aspirating type of foam production system where aeration is done at the branch pipe. The expansion ratio of the foam produced shall not be less than eight times with the use of the foam compound as prescribed in IS : 4989-1974\* to give the performance indicated in **2.3**.

**2.3.2** The foam induction may be automatic or manual, if one branch is in operation, all further addition and removal of branches shall automatically adjust the rate of foam compound induction within variation of 0.5 percent, the induction ratio not exceeding 6 percent.

**2.4** A hose reel service shall be provided on the appliance. In addition to water carried on it, it should also be possible to use water from a hydrant or a static supply.

**2.5** The supplementary agent used for fire fighting shall be dry chemical powder ( *see* Appendix A ).

**2.6** The unit shall be designed to be as compact as possible, compatible with ease of accessibility to all service parts. The pump and foam making equipment controls shall be so arranged that one man can operate foam or water lines from the pump control panel.

**2.7** Lever type valve controls shall be preferred throughout unless these are impracticable in any case.

### **3. MATERIAL SELECTION AND TREATMENT**

**3.1** The choice of materials to be used for the construction of the appliance shall be made with a view to combine lightness with strength and durability.

**3.2** Timber shall not be used in body construction.

**3.3** The appliance is intended for use in tropical conditions with constant high humidity and heat. This shall be given full consideration while selecting the materials and, for this reason, use of rubber or other similar materials shall be avoided as far as possible. When it is unavoidable, the parts made out of these materials shall be easily replaceable and shall be easily available.

---

\*Specification for foam compound for producing mechanical foam for fire fighting ( *first revision* ).

## **IS : 10460 - 1983**

**3.4** All parts which form waterways or come into contact with foam solution shall be of corrosion resisting materials or suitably treated with corrosion resistant compound. All metal parts exposed to atmosphere shall either be of corrosion resisting material or treated suitably to resist corrosion.

**3.5** Ferrous metal shall not be used for chromium plated fittings and the plating of all such fittings shall be of proper quality.

**3.6** Lubricating nipples shall be provided wherever necessary.

## **4. DESIGN AND CONSTRUCTION**

### **4.1 Engine**

**4.1.1** The engine shall be provided with cooling system to permit its continuous stationary running without overheating. Indirect cooling system shall be incorporated, which shall be of the open circuit type discharging water to the waste.

**4.1.2** The operating temperature of the engine cooling water shall preferably be thermostatically controlled.

**4.1.3** The oil in the oil sump shall be prevented from overheating.

**4.1.4** Suitable gauge for cooling water and glow lamp for lubricating system shall be provided in the driver's cab and on the pump panel. This shall be marked with operating temperature.

**4.1.5** External filter shall be provided for the lubricating system and a tubular dip-stick to gauge the level of oil in the oil sump shall be provided.

### **4.2 Electrical System**

**4.2.1** A trickle type battery charger shall be provided for recharging the battery *in situ*. A red pilot lamp, indicating when the batteries are being charged from an external supply, shall be provided.

**4.2.2** All important electrical circuits shall have separate fuses suitably indicated and shall be grouped into a common fuse box located in an accessible position in driver's cab and fitted with means for carrying spare fuses. The wiring shall be single pole and shall not be exposed to the atmosphere. Conduits shall be used wherever necessary.

### **4.3 Water Tank**

**4.3.1** A water tank of not less than 1 800/2 000 l capacity shall be mounted on the chassis. It shall be fabricated out of mild steel sheet of minimum 3 mm thickness or any other suitable material of equal

strength and durability. If of mild steel or of other material, liable to corrode, it shall be treated for anti-corrosion with epoxy paint consisting of one coat of primer and two coats of finish after sand blasting of inside surface and shall be suitably baffled to prevent surge when the vehicle is braking, accelerating or cornering. The baffle shall be arranged in a manner to facilitate the passage of a man throughout the tank for cleaning purposes. It shall be mounted on the chassis in a manner keeping in view the proper load distribution on the axles and shall be so designed as to bring the centre of gravity as low as possible in the chassis. It shall be rectangular in shape and the mounting of the tank shall be flexible type to prevent the tank's distortion due to the chassis flexion. The mounting shall permit full contents of the tank to flow into the pump. The tank with its fitments shall withstand hydrostatic pressure of 0.3 bar.

**4.3.2** Suitable eyes shall be provided on the shell of the tank to enable the tank to be lifted off the vehicle for repairs or replacement as necessary.

**4.3.3** The tank shall be fitted with two filling orifices, a drain cock, a manhole and a cleaning hole. The filling orifice shall be of not less than 250 mm diameter and shall be fitted with a manhole cover of 45 cm dia minimum and a filler cap clearly marked 'water' preferably cast in metal. In addition, a 63 mm instantaneous hydrant connection, incorporating a strainer, shall be provided close to the pump panel control for filling the tank through 75 mm diameter pipe or feeding the hose reel equipment. An 100 mm dia pipe line shall be taken from the tank to the suction inlet of the pump incorporating an 100 mm quick action spherical type valve. Separate valve(s) for performing different functions shall be provided to control the flow of water. Drain plugs or cocks shall be provided wherever necessary. A cleaning hole of not less than 25 cm diameter shall be provided at the bottom of the tank and it shall be fitted with bolted cover.

**4.3.4** The tank shall be fitted with a 50 mm diameter overflow pipe. The discharge ends of the overflow pipes shall be taken down to a point well below the chassis without reducing the effective ground clearance when fully loaded, and shall discharge away from the wheels.

**4.3.5** Dial gauge water level indicator for the tank shall be provided preferably in the driver's cab or a visual level gauge of the glass tube shall be provided at the control panel calibrated 1/4, 1/2, 3/4 and full (preferably calibrated in litres).

**4.3.6** The tank shall be connected to the pump and hose reel in such a manner that pressurization of water tank or water tank-pump connection is not possible when pumping water from an outside source of supply.

## **IS : 10460 - 1983**

**4.3.7** The plumbing between the pump and the hose reel shall have a clear and unobstructed water way of not less than 25 mm throughout without any obstruction.

### **4.4 Hose Reel**

**4.4.1** One hose reel ( *see* IS : 884-1985\* ) shall be provided at the rear of the appliance with 60 m lengths of 20 mm bore hose connected by screw 'C' type quick release couplings and terminating with a control branch and 5 mm nozzle. The reel shall be fitted with over brake or locking device.

### **4.5 Pump**

**4.5.1** The pump shall preferably be made of any suitable alloy, compatible with all types of synthetic and protein foam compound, with stainless steel shaft suitable for use with brackish water. The pump shall be capable of delivering not less than 1 800 l/min of water at a pressure not less than 8.5 kg/cm<sup>2</sup>. The pump shall preferably be of the single stage type. The pump shaft shall preferably be designed to run on two deep-groove ball bearings lubricated by oil bath to ensure long troublefree service. A mechanical seal shall be provided which shall be capable of running dry for long periods without damage.

**4.5.1.1** The pump shall be run for a period of 4 hours non-stop delivering the rated output at 7 kgf/cm<sup>2</sup> with the lift of 3 m. During the test the water shall not be replenished for the cooling system as the temperature of the engine oil should not exceed 150°C or the engine manufacturers rated temperature for continuous working whichever is less. The engine should show no sign of stress during the stress. The temperature of the cooling water (radiator water) shall not exceed 85°C. The pump casing and impeller shall be subjected to a hydraulic pressure of 21 kgf/cm<sup>2</sup> to detect leakage, performance, etc.

**4.5.2** The pump shall be preferably mid-ship mounted. The pump control panels shall be located on either side of the appliance in case of mid-ship mounted.

**4.5.3** The suction inlet and delivery outlets of the pump shall, as far as possible, be fitted on or near the pump control panel(s).

**4.5.4** A removable strainer and blank cap shall be provided for the suction inlet(s) for the pump.

**4.5.5** The suction inlet shall be fitted with a standard round thread connection of 100 mm size conforming to IS : 902-1974 'Specification for suction hose couplings for fire fighting purposes ( *second revision* )'.

**4.5.6** The delivery outlets of the pump shall terminate in 63 mm female instantaneous coupling incorporating a blank cap and means for relieving pressure between the valve and the cap. The 63 mm female

---

\*Specification for first-aid hose reel for fire fighting ( *first revision* ).

instantaneous coupling shall be in accordance with IS : 903-1988\*.

**4.5.7 Plumbing**, if any, for deliveries and the monitor, shall be adequate in dimension to ensure that it shall feed adequately the foam producing mixture at its maximum rates of output.

**4.6 Primer** — The primer may be semi automatic in action and it shall dis-engage automatically as soon as the pump is primed. It shall be capable of lifting water at least through 7.0 m at a rate of not less than 30 cm per second.

#### **4.7 Foam Equipment**

**4.7.1 Compound Tank** — A foam compound tank of 500 l capacity shall be mounted on the chassis in addition to the water tank and as a separate and distinct unit which can be removed separately for replacement.

**4.7.1.1** The foam compound tank shall be of rigid type, and shall preferably be of stainless steel welded construction.

**4.7.1.2** The tank shall have a filling orifice of not less than 150 mm diameter with a removable strainer fitted to it. The strainer shall be of such material as shall not be affected by constant contact with foam compound and its total screening area shall be adequate to permit quick filling of foam compound into the tank. The filler cap shall be clearly marked 'FOAM' preferably by pressing, casting or embossing.

**4.7.1.3** The tank shall have its top dished tunneling arrangement and a trough provided to enable easy filling from 20 litre drums. Suitable sharp-edged tin opener may also be provided at the foam tank filling mount for puncturing the foam compound drum for facilitating quick filling of the foam compound directly from the drums into the tank. The tank shall be suitably baffled to prevent surge while the vehicle is in motion or standing on uneven ground or brakes are applied to the moving appliance. The design of the tank shall incorporate a removable sump fitted with a drain valve. The foam compound draw-off tube shall be positioned in the centre of the sump in such a manner that foreign matter or sludge shall not pass into the compound line. The draw-off tube shall be fitted with a gauge strainer of suitable material, mesh, size, and adequate straining area. The tank top shall be removable and it shall be ensured that the joint between the top and the body of the tank is leakproof.

**4.7.1.4** Means shall be provided for automatic venting of the foams compound tank when the foam is being produced or the tank is being filled. This shall not be incorporated with the cap. The device employed shall be as simple as possible and shall not get clogged easily during normal use of the appliance.

---

\*Specification for fire hose delivering couplings, branch pipe nozzles and nozzle spanner (*third revision*).

## **IS : 10460 - 1983**

**4.7.1.5** The draw-off tube shall be connected to the foam compound proportionator/inductor and pump, as necessary, and automatic flow control valve shall be incorporated in it so as to maintain a constant induction rate of not more than 6 percent with varying foam output. The plumbing for this purpose shall have a clear and unobstructed passage of not less than 50 mm throughout and shall:

- a) be as short as possible;
- b) be capable of being easily dismantled for internal cleaning;
- c) be provided with means of thorough flushing after use; and
- d) not form 'U' bend or abrupt angle at any portion and be capable of being drained easily without dismantling.

**4.7.1.6** A suitable transfer pump shall be provided for transferring foam compound from drums to the foam compound tank without causing any frothing in the tank. Necessary connection shall also be provided for transferring the foam compound through this pump.

**4.7.1.7** Provision shall also be made for drawing foam compound into the foam producing system from an external source through a pick-up tube while producing foam.

**4.7.2** Foam compound proportionator or inductor automatic proportionating arrangement shall be provided where the induction ratio of foam compound/water solution and flow of water are automatically varied as desired merely by opening and closing the monitor or hand lines. This shall be achieved without any complex system of linkage that may be susceptible to distortion due to chassis flexion. The system shall be reliable and shall not require frequent calibration checks.

### **4.7.3 *Foam Monitor***

**4.7.3.1** A foam monitor shall be mounted on the top of the appliance in such a manner that it can be manually operated by a member of the crew. The monitor shall be capable of traversing through 360° in a horizontal plane, elevating from horizontal to 45° and depressing from horizontal to not less than 15° and fully rotating in both directions.

**4.7.3.2** The aggregate foam discharge shall be not less than 13 500 l/min through a combination of monitor and up to 2 hand lines or 7 000 l/min through monitor only.

**4.7.3.3** The monitor shall be capable of projecting the foam discharge to an effective distance of not less than 35 m in still air when operated at the designed pressure in a straight jet pattern without dripping.

### **4.7.4 *Hand Lines***

**4.7.4.1** Two hand lines one on either side of the appliance in case of

mid-ship mounted pump shall be provided. These shall terminate in foam making branch pipes, fitted with spray or jet attachments, and preferably also fitted with hand control. Each foam making branch pipe shall be capable of delivering not less than 500 l/min of water foam solution with an expansion of not less than 8 and minimum throw of 25 m when either all the handles only are used simultaneously or at least one of them is used in combination with the monitor.

**4.7.4.2** The hand lines shall be stowed in quick-release clamps or lockers as close as possible to the pump operating panel. The hoses for the hand lines shall have an internal diameter of 63 mm. These shall be of the reinforced rubber lined or similar type and be in lengths of 30 m each and conforming to Type II of IS : 636-1979\*.

#### **4.8 Control Panels**

**4.8.1** Adequately illuminated control panel shall be provided and positioned as follows :

- a) Rear mounted pump — one control panel at the rear of the appliance.
- b) Mid-ship mounted pump — two control panels, one on each side of the appliance.

**4.8.2** The control panel(s) shall include the following:

- a) Throttle control for engine;
- b) Pressure gauge 0 to 1.75 MN/mm<sup>2</sup> (17.5 kgf /cm<sup>2</sup>);
- c) Compound gauge calibrated as under:  
Vacuum — 0 to 75 cm Hg, preferably in black,  
Pressure — 0 to 0.6 MN/mm<sup>2</sup> (6 kgf /cm<sup>2</sup>), preferably in black;
- d) Primer control (if the primer is not fully automatic);
- e) Gauge for cooling water and glow lamp for lubricating system; and
- f) Cooling water circuit control.

**4.8.3** The following shall also be provided at a convenient position near the control panel(s) :

- a) Control for using monitor;
- b) Water level indicator;
- c) Hydrant connections;
- d) Control for using auxiliary foam compound pick-up tube; and
- e) Control(s) for flushing out the foam making equipment and its plumbing.

---

\*Specification for fire fighting hose (rubber lined, or rubberized fabric lined woven-jacketed) (*second revision*).

## **4.9 Body Work and Stowage**

**4.9.1** Enclosed accommodation for six persons shall be provided in the driver cab-cum-crew compartment including the driver and the incharge of the crew. Two doors on each side shall be provided on the driver cab-cum-crew compartment. The doors shall be hinged opening outwards and shall be hung forward and shall have catch locks and flush type handles.

**4.9.2** The cab and lockers should be of composite construction with sufficient rigidity and reinforcement and shall be kept as light as possible. Pressed sections of sufficient strength shall be used for the superstructure.

**4.9.3** Lockers shall be provided for secure stowage of all equipment given in Appendix B. The height of the lockers from the bottom to the top of the opening shall be not less than 600 mm and the depth not less than 600 mm.

**4.9.4** All lockers shall be provided with internal automatic lighting arrangement with the master switch in the cab. The doors of the side lockers shall not be hinged at the bottom.

**4.9.5** Hose tunnels shall be provided to carry four 2.5 m lengths of suction hoses in convenient location. The tunnels should be sloped in such a way so that these allow the water or contents left in the hose after use to flow out.

**4.9.6 Ladder Gallows** — Gallows shall be provided to carry a 10.5 m extension ladder at a suitable position in a manner that does not provide any obstruction to the working of monitor. The design shall be such that the ladder can be released without difficulty from a reasonably accessible position and shall embody rollers to permit easy withdrawal by one man. Means shall also be provided for locking the ladder when stowed.

**4.9.7 Tool Kit Container** — A specially fitted recessed tray for the normal kit of tools, carried on the appliance shall be provided.

**4.10 Stability** — The stability of the appliance shall be such that when under fully equipped and loaded conditions (but excluding crew), if the surface on which the appliance stands is tilted to either side, the point at which overturning occurs, is not passed at an angle of 30 degrees from the horizontal.

## **5. WORKMANSHIP AND FINISH**

**5.1** All parts of the appliance shall be of good workmanship and shall have streamlined finish.



5.2 The appliance shall be painted in fire red colour conforming to Shade No. 536 of IS : 5-1978\*. The paint shall conform to IS : 2932- 1974†.

## 6. INSTRUCTION BOOK, ACCESSORIES AND EQUIPMENT

**6.1 Instruction Book or Books** — Instruction book(s) for the guidance of the user(s) including both operating and normal maintenance procedure shall be supplied. The book(s) shall include an itemised and illustrated spare parts list giving reference numbers of all the wearing parts.

### 6.2 Accessories

**6.2.1** The following accessories shall be provided in addition to those normally fitted on modern commercial vehicles:

- a) *Fire bell* — A 250 mm diameter fire bell shall be mounted externally and shall be capable of being operated from within the driving compartment. The bell shall be of the hand operated type.
- b) *Hand lamps* — Two.
- c) *Fog lamps* — Two.
- d) *Reversing light* — Lamp suitably situated to assist reversing.
- e) *Amber blinker lights* — Situated on the head of the driving compartment.
- f) *Trafficators* — Illuminated with indicating lights on instrument panel or in any other prominent position in driving compartment.
- g) Wind screen wipers
- h) *Tools* — All tools required for normal routine maintenance of the appliance which are not included in the kit for the chassis.
- j) *Siren* — Battery operated.
- k) *Search light* — Adjustable to give flood or beam light, mounted in a convenient position but capable of being readily disconnected and mounted on a tripod away from the appliance, complete with tripod and with not less than 30 m of TRS cable on a reel mounted on the appliance.
- m) *Spot light* — Adjustable, mounted in a convenient position on the near side of the driving compartment.

---

\*Colours for ready mixed paints and enamels ( *third revision* ).

†Specification for enamel, synthetic, exterior (a) undercoating, (b) finishing ( *first revision* ).

- n) *Inspection lamp* — Protected type on wander lead with plug. A socket shall be provided in the control panel in the driver's cab for plugging in the lamp.
- p) *Tail lamps* — Two of combined stop and tail.
- q) Rear reflectors
- r) *Wind screen-washer* — Fitted in a suitable location with controls in driving compartment.
- s) Cas, instrument panel and locker, light.
- t) Public address system if required.

## **7. MARKING**

**7.1** Each appliance shall be clearly and permanently marked with the following information:

- a) Manufacturer's name, or trade-mark, if any;
- b) Capacity of the pump in litres/minute, capacity of the water tank and foam tank in litres; and
- c) Year of manufacture.

# **A P P E N D I X A**

( *Clauses 2.1 and 2.5* )

## **SUPPLEMENTARY EXTINGUISHING AGENT**

### **A-1. DETAILS OF DRY CHEMICAL POWDER**

**A-1.1** The total quantity of supplementary agent shall be not less than 150 kg of dry powder and shall conform to IS : 4308-1982\*.

**A-1.2** The dry powder system shall comply with the following minimum requirements.

**A-1.2.1** The dry powder system shall comprise of two self contained units, each having a capacity of 75 kg of dry powder.

**A-1.2.2** The expellant employed for the dry powder units shall be nitrogen. The capacity of the nitrogen cylinders employed for this purpose shall be adequate to ensure complete discharge of the dry powder contents at a rate of not less than 2.25 kg/s from each units. A well-designed pressure control system shall be provided to regulate the pressure of nitrogen gas and maintain a constant powder discharge pressure throughout the operation of the unit.

---

\*Specification for dry powder for fire fighting ( *first revision* ).

**A-1.2.3** The dry powder unit shall have a discharge outlet fitted with not less than 22 m of minimum 25 mm bore hose terminating in a trigger control shut-off nozzle, capable of producing either a straight jet or fan-spray pattern of discharge. The range of jet shall be not less than 12 m.

**A-1.2.4** The hose and nozzle shall be stowed suitably in lockers on either side of the appliance to facilitate speedy runout on arrival at an accident.

## **A P P E N D I X   B**

( *Clauses 0.6, 2.1, 2.8 and 4.9.3* )

### **SCHEDULE OF EQUIPMENT TO BE SUPPLIED WITH THE APPLIANCE**

<i>Sl No.</i>	<i>Item</i>	<i>Quantity</i>
1)	Extension ladder — 10.5 m ( <i>see IS : 4571-1977<sup>1</sup> or IS : 930-1977<sup>2</sup></i> )	1
2)	Armoured suction hose complete with round thread couplings to suit the pump inlet — 2.5 m long ( <i>see IS : 2410-1963<sup>3</sup> and IS : 902-1974<sup>4</sup></i> )	4 lengths
3)	Delivery hose, 63 mm, rubber lined in 30 m lengths ( <i>see type II of IS : 636-1979<sup>5</sup></i> ) complete with instantaneous couplings ( <i>see IS : 903-1975<sup>6</sup></i> )	10 lengths
4)	Suction strainer for item 2 ( <i>see IS : 907-1965<sup>7</sup></i> )	1
5)	Basket strainer for item 2 ( <i>see IS : 3582-1966<sup>8</sup></i> )	1
6)	Dividing breaching made of light alloy ( <i>see IS : 5131-1969<sup>9</sup></i> )	2
7)	Collecting breachings made out of light alloy ( <i>see IS : 905-1980<sup>10</sup></i> )	2
8)	Suction wrenches ( <i>see IS : 4643-1968<sup>11</sup></i> )	1 pair
9)	Long line, 50 mm circumference, 30 m long ( <i>see IS : 1084-1969<sup>12</sup></i> )	2 lengths
10)	Short line, 50 mm circumference, 15 m long ( <i>see IS : 1084-1969<sup>12</sup></i> )	2 lengths

## IS : 10460 - 1983

11) Hose bandages, rubberised [ ( see IS : 5612 (Part I)-1977 <sup>13</sup> ]	12
12) Hose clamps [ see IS : 5612 (Part II)-1977 <sup>14</sup> ]	6
13) Hydrant valve key and bar [( see IS : 910-1980 <sup>15</sup> )]	1 set
14) Protective clothing for firemen complete with gloves, boots, helmets with suitable face shield made out of material capable of reflecting at least 95 percent of radiant heat temperatures around 1 500 to 2 000°C and also afford some protection against direct flame. The suit will be of sufficient size to accommodate a breathing apparatus to users.	2 sets
15) Fog nozzle ( see IS : 952-1969 <sup>16</sup> ) with extension applicator with fog head.	1
16) Hand controlled branch for 63 mm size hose coupling.	1
17) Branch pipe, universal ( see IS : 2871-1983 <sup>17</sup> )	1
18) Branch with revolving head ( see IS : 906-1972 <sup>18</sup> )	1
19) Branch pipe ( see IS : 903-1975 <sup>6</sup> )	4
20) Nozzle of sizes 12 mm, 16 mm, 20 mm and 32 mm (two each) ( see IS : 903-1975 <sup>6</sup> )	10
a) Adaptor for 100 mm suction female screw coupling and 63 mm male instantaneous.	2
b) Adaptor double female instantaneous pattern 63 mm.	2
c) Adaptor double male instantaneous pattern 63 mm.	2
21) Nozzle spanners ( see IS : 903-1975 <sup>6</sup> )	2
22) Portable electric box lamp with rechargeable accumulator.	2
23) Hand lamp (torch — 4 cells )	2

24) Flameproof lamp (usable in the present of inflammable gases of vapours)	2
25) Self contained breathing apparatus (compressed air type) complete with spare cylinder and tool kit	1 set
26) First aid box for 10 persons	1
27) Rubber gloves (in case) ( see IS : 4770-1968 <sup>19</sup> )	1 pair
28) Asbestos guantlets (in case)	1 pair
29) Axe, large ( see IS : 703-1966 <sup>20</sup> )	1
30) Spade	1
31) Pick axe ( see IS : 273-1973 <sup>21</sup> )	1
32) Crow bar ( see IS : 704-1968 <sup>22</sup> )	1
33) Sledge hammer, 6.5 kg ( see IS : 841-1968 <sup>23</sup> )	1
34) Carpenter's saw, 60 cm ( see IS : 5098-1964 <sup>24</sup> )	1
35) Hydraulic jack — 7.5 tonne	1
36) Fire hook ( see IS : 927-1981 <sup>25</sup> )	1
37) Tool kit	1

- 
1. Specification for aluminium extension ladder for fire brigade use ( *first revision* ).
  2. Specification for wooden extension ladder for fire brigade use ( *first revision* ).
  3. Specification for suction hose of rubber for fire services.
  4. Specification for suction hose couplings for fire fighting purposes ( *second revision* ).
  5. Specification for fire fighting hose (rubber lined, or rubberised fabric lined, wooven jacketed ( *second revision* ).
  6. Specification for fire hose delivery couplings branch pipe, nozzles and nozzle spanner ( *second revision* ).
  7. Specification for suction strainers, cylindrical and shoe types, for fire fighting purposes.
  8. Specification for basket strainers for fire fighting purposes (cylindrical type).
  9. Specification for dividing breeching with control for fire brigade use.
  10. Specification for delivery breechings, dividing and collecting, instantaneous pattern for fire fighting purposes ( *second revision* ).
  11. Specification for suction wrenches for fire brigade use.
  12. Specification for manila ropes ( *second revision* ).
  13. Specification for hose-clamps and hose-bandages for fire brigade use : Part I hose-clamps ( *first revision* ).
  14. Specification for hose-clamps and hose-bandages for fire brigade use : Part II Hose-bandages ( *first revision* ).
  15. Specification for combined key for hydrant, hydrant cover and lower valve ( *first revision* ).

## IS : 10460 - 1983

16. Specification for fognozzle for fire brigade use.
17. Specification for branch pipe, universal, for fire fighting purposes ( *first revision* ).
18. Specification for branch with revolving head for fire fighting purposes ( *second revision* ).
19. Specification for rubber gloves for electrical purposes.
20. Specification for axes ( *revised* ).
21. Specification for picks and beaters ( *second revision* ).
22. Specification for crow-bars and claw-bars ( *first revision* ).
23. Specification for hand hammers ( *first revision* ).
24. Specification for cross-cut and rip saws.
25. Specification for fire hooks ( *second revision* ).

( Continued from page 2 )

<i>Members</i>	<i>Representing</i>
DIRECTOR	West Bengal Fire Services, Calcutta
SHRI G. N. GIDWANI	Directorate General of Supplies & Disposals, New Delhi
SHRI D. N. PANDIT ( <i>Alternate</i> )	
SHRI G. B. MENON	Ministry of Home Affairs
COL S. A. MOHILE	Ministry of Defence (R&D)
SHRI A. K. SURI ( <i>Alternate</i> )	
SHRI V. B. NIKAM	Municipal Corporation of Greater Bombay (Bombay Fire Brigade), Bombay
SHRI H. M. SABADRA	Reliable (Fire Protection) Industries, Bombay
SHRI K. K. SAWHNEY	Air Foam Industries Pvt Ltd, New Delhi
SHRI R. MEHTA ( <i>Alternate</i> )	
SHRI P. H. SETHNA	Kooverji Devshi & Company (P) Ltd, Bombay
SHRI N. T. PANJWANI ( <i>Alternate</i> )	
SHRI S. S. L. SHARMA	Municipal Corporation of Delhi (Delhi Fire Service), Delhi
SHRI R. K. BHARDWAJ ( <i>Alternate</i> )	
SHRI D. K. SIRKAR	Synthetics and Chemicals Limited, Bareilly
SHRI S. VENKASWAMY	Directorate General of Civil Aviation, New Delhi
SHRI B. V. WAGLE	Urban Development Public Health, Housing Department, Government of Maharashtra
SHRI V. H. MADKAIKAR ( <i>Alternate</i> )	

## INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

### Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

### Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

### Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s <sup>2</sup>
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz = 1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>



## Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

## Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

## Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

This Indian Standard has been developed by Technical Committee : BDC 22

### Amendments Issued Since Publication

Amend No.	Date of Issue
Amd. No. 1	November 1988

## BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002.  
Telephones: 323 01 31, 323 33 75, 323 94 02

Telegrams: Manaksanstha  
(Common to all offices)

Regional Offices:

	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	{ 323 76 17 323 38 41
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700054	{ 337 84 99, 337 85 61 337 86 26, 337 91 20
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022	{ 60 38 43 60 20 25
Southern : C. I. T. Campus, IV Cross Road, CHENNAI 600113	{ 235 02 16, 235 04 42 235 15 19, 235 23 15
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400093	{ 832 92 95, 832 78 58 832 78 91, 832 78 92
Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISHAKHAPATNAM	